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CLAIMS

[Claim 1] The nonaqueous battery characterized by using metal multiple oxide expressed by empirical formula $\text{Li}_x\text{B}_y\text{Ni}_z\text{Co}_w\text{O}_a$ (wherein, $0 < x < 1.3$, $y > 0$, $0 \leq w < z$, $y + z + w = 1$, and $1.8 \leq a \leq 2.2$.) as a positive active material in the nonaqueous battery using the material which can intercalate or de-intercalate lithium ion or lithium metal

[Claim 2] The nonaqueous battery according to claim 1 whose y in the aforementioned empirical formula is 0.01-0.3.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0006] [The purpose of this invention]

To offer the highly safety nonaqueous battery which seldom carries out unusual generation of heat even when cell temperature rises, since the reaction start temperature of a positive active material and the electrolytic solution is high.

[0015] (Example 1)

The flat type nonaqueous battery (this invention cell) was produced.

[0016] [Production of positive electrode]

LiOH, B₂O₃, Ni(OH)₂, Co₂(OH) are mixed at the rate of the atomic ratio 1.0 : 0.01 : 0.5 : 0.49. It was calcinated at 800 degree C for 20 hours, and is empirical-formula LiB_{0.01}Ni_{0.5}Co_{0.49}O₂.

[0017] Subsequently, this cathode powder, the acetylene black as an electric conductive agent, and the fluorine resin powder as a binder were mixed at 90 : 6 : 4. It was pressed at 2 t/cm²,

AM2

and was dried at 250 degree C. The disc-like positive electrode with a diameter of 20mm was produced. In addition, the stainless steel plate (SUS304) was used as positive-electrode current collection field.

[0023] (Example 2)

Empirical-formula $\text{LiB}_{0.1}\text{Ni}_{0.5}\text{Co}_{0.4}\text{O}_2$

[0024] (Example 3)

Empirical-formula $\text{LiB}_{0.20}\text{Ni}_{0.5}\text{Co}_{0.3}\text{O}_2$

[0025] (Example 4)

Empirical-formula $\text{LiB}_{0.30}\text{Ni}_{0.5}\text{Co}_{0.2}$

[0026] (Example 5)

Empirical-formula $\text{LiB}_{0.35}\text{Ni}_{0.5}\text{Co}_0$

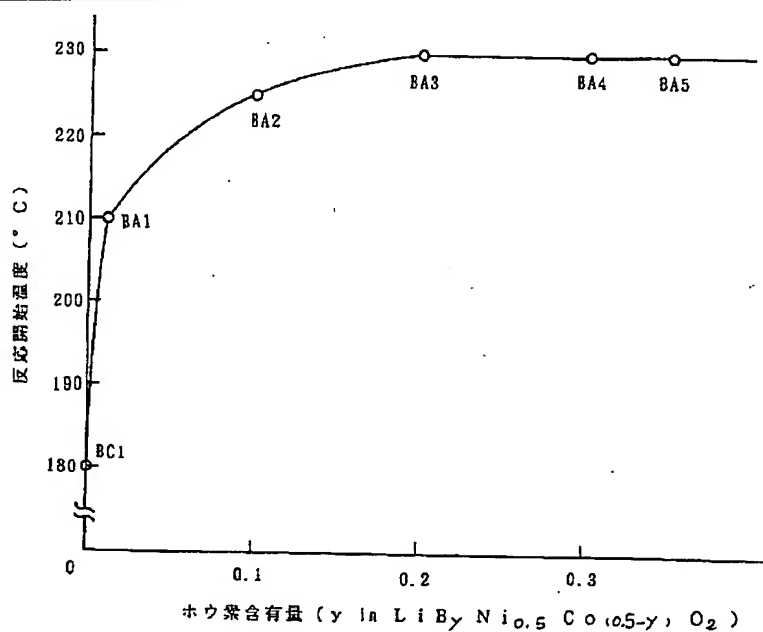
[0027] (Example of a comparison)

Empirical-formula $\text{LiNi}_{0.5}\text{Co}_{0.5}\text{O}_2$

[Drawing 2]

[Drawing 3]

Onset temperature of exothermic reaction



Discharge Capacity

